CONDENSED TEST PROCEDURES CCT-10

Plug tester in, TEST SELECTOR to COND. allow tester warm-up.

CONDENSER TESTS

To perform condenser tests with the condenser in the distributor, it will be necessary to disconnect the distributor primary lead and to block the ignition points open.

1. TEST SELECTOR to COND.

2. Connect TEST LEADS together and calibrate meter to SET LINE.

3. Attach TEST LEADS; one to condenser pigtail, the other to the condenser case. With COND. TEST selector in SERIES RESISTANCE position, read Black SERIES RESISTANCE Bar at right end of meter.

4. Turn COND. TEST selector to LEAK. position; read Black LEAKAGE Bar at left end of meter.

5. Turn COND. TEST selector to CAP. position; read CAPACITY in MFD. (Microfarads) on Red Scale of meter. Compare to specifications.

OHMMETER USAGE

Never connect the OHMMETER across any source of voltage.

1. TEST SELECTOR to OHM.

2. Turn OHMS Range selector to desired range.

3. Connect TEST LEADS together and calibrate to SET LINE. It will be necessary to recalibrate OHMMETER whenever range is changed.

4. Connect TEST LEADS one to each end of circuit being tested.

5. Read OHMMETER Scale for resistance values of circuit being tested.

COIL TEST

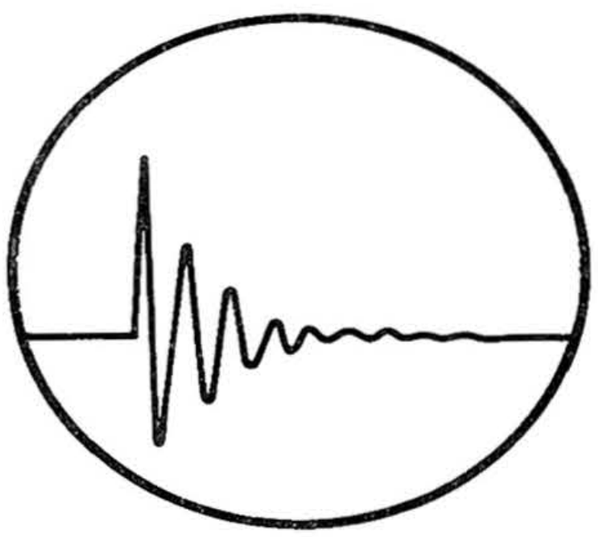
1. Electrically isolate coil and connect TEST LEADS, one to each primary coil terminal observing polarity (Red to +, Black to -).

2. Install COIL PICKUP into secondary terminal. Connect Ground Lead to a good ground.

3. Rotate CALIBRATOR full counterclockwise.

4. Set COIL TYPE switch to appropriate position for coil being tested.

5. Rotate TEST SELECTOR switch to COIL TEST position and observe pattern. While TEST SELECTOR is in COIL TEST position, adjust CALIBRATOR to provide more coil output. Do not exceed 25 KV or damage to coil may result. Pattern should be steady and as illustrated.



Normal - Waveform height is 20 KV or more and oscillations resemble those in illustration.

OPERATING INSTRUCTIONS
COIL CONDENSER TESTER
MODEL CCT-10

The Model 10 Coil Condenser Tester contains complete facilities for testing ignition type condensers, ignition coils, and is also equipped with a sensitive four range OHMMETER. The four ranges on the OHMMETER are 0 to 100 OHMS, 0 to 1000 OHMS, 0 to 10,000 OHMS, and 0 to 100,000 OHMS.

CONDENSER TESTS

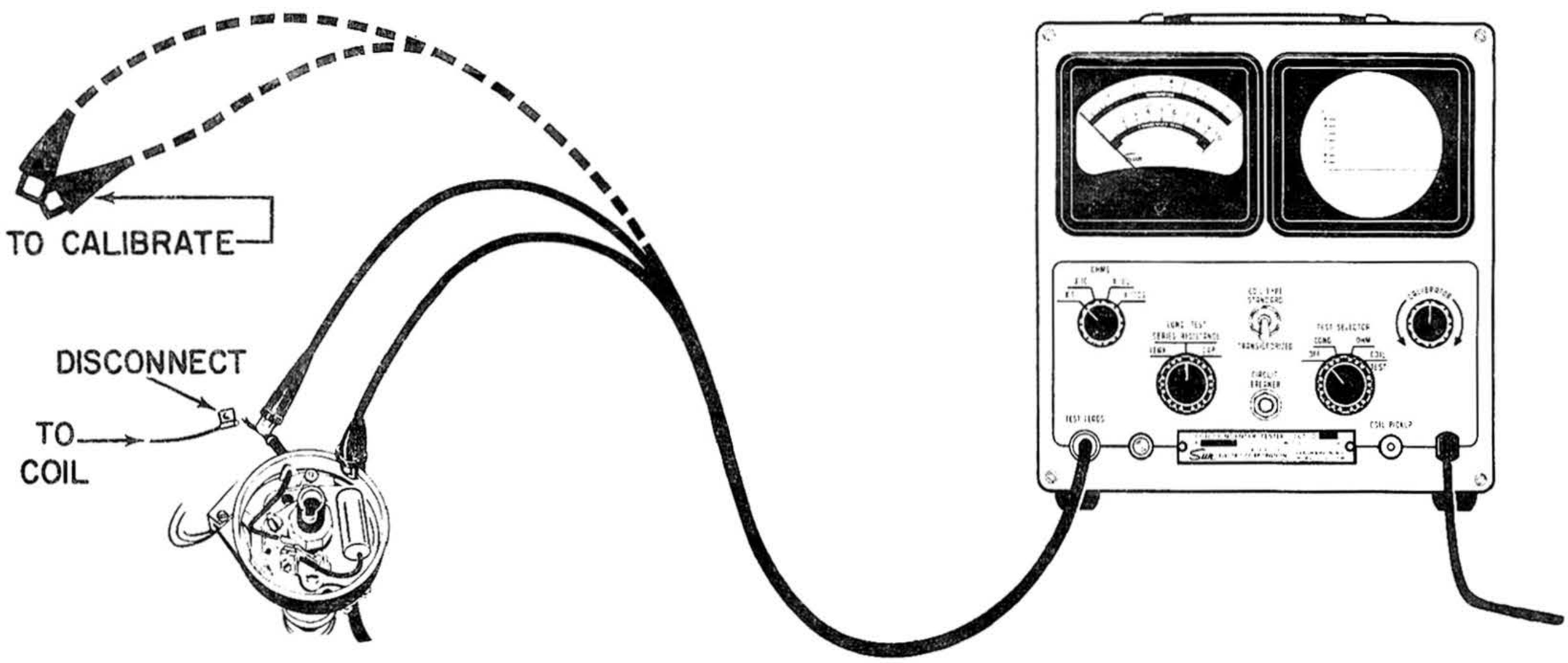
The purpose of the condenser in the ignition system is to prevent arcing and pitting of the breaker points, and to aid in collapsing the magnetic field of the coil. In order to function properly and to insure good ignition, the condenser must have the following characteristics.

1. Minimum series resistance.
2. Minimum insulation leakage.
3. Correct capacity.

CALIBRATION

1. Plug power cord into proper AC outlet.
2. Turn TEST SELECTOR switch to COND. position.
3. Clip Red and Black TEST LEADS together.
4. After allowing approximately one minute for warm-up, adjust CALIBRATOR until meter pointer rests on SET LINE.
5. Separate TEST LEADS and proceed with tests.

   NOTE: Ignition condensers may be tested in or out of the vehicle. If a condenser is to be tested in the vehicle, the condenser must be electrically isolated from the rest of the system. Disconnect the distributor primary wire from the coil and block the ignition points open.



CONDENSER RESISTANCE TEST

1. Connect the TEST LEADS, one to the primary terminal of the distributor, the other to a ground on the distributor body. If the condenser is removed from the distributor, connect one lead to the pigtail, the other to the condenser case.
2. With the COND. TEST switch in SERIES RESISTANCE position, the meter should read in the Black Bar at right end of scale. Move the condenser pigtail. If a deflection of the meter is noted, the pigtail is making poor contact and the condenser should be replaced. If the reading is outside the Black Bar, move the grounded lead to the condenser body. If the reading improves, the condenser is not properly grounded to the distributor housing.

LEAKAGE TEST

1. Turn the COND. TEST switch to LEAK. position.

2. The meter should now read in the Black Bar at the left end of the scale if the condenser insulation is satisfactory.

3. If the meter reads outside the Black Bar, the condenser insulation is not satisfactory and the condenser should be replaced.

CAPACITY TEST

1. Turn COND. TEST switch to CAP. position.

2. Read Red scale of meter (0 to 1.0) for the Microfarad capacity of the condenser being tested.

3. Refer to manufacturer's specifications for recommended condenser capacity.

4. If tester reading in Microfarads does not fall within tolerances specified, the condenser should be replaced.

   NOTE: If the condenser does not meet specifications while mounted in the distributor, remove the condenser and retest it. Follow the same procedure. If the condenser tests "bad" in the distributor but "good" on the bench, there is a short or ground in the distributor primary circuit. Inspect the insulation of the distributor primary terminal and the internal circuit of the distributor.

USE OF THE TESTER AS AN OHMMETER

The four OHMMETER Ranges provided in this tester may be used for testing the condition and continuity of the ignition system and the electrical system components. The OHMMETER scale reads from right to left and is graduated from 0 to 100. With the OHMS switch set in the X1 position, resistance is as indicated on the meter. When the OHMS switch is in the X10, X100 or X1000 position, meter readings are multiplied by 10, 100 or 1000 respectively.

CAUTION: Do not connect the TEST LEADS across any source of voltage. For accurate readings, the portion or component of the system being tested must be electrically isolated or disconnected from the rest of the system.

CALIBRATION

1. Plug power cord into proper AC outlet.

2. Turn TEST SELECTOR switch to OHM position.

3. Turn OHMS switch to desired OHMMETER Range.

4. Connect TEST LEADS together.

5. Adjust CALIBRATOR until meter pointer reads on zero of the OHMMETER scale.

6. Disconnect TEST LEADS and connect them, one to each end of circuit or component being tested.

7. Read OHMMETER scale (Blue) for resistance values of circuit being tested.

SUGGESTED APPLICATIONS OF OHMMETER

1. Circuit continuity for locating broken wires or poor connections in such circuits as horn, overdrive, turn signals, lights, or accessories.

2. Bench testing relays, switches, and solenoids.

3. Generators (on or off vehicle) for checking generator circuit continuity and field coil resistance.

4. Regulators (on or off vehicle) for locating open resistors or shunt windings.

5. Car radio antennas, checks for shorts or grounds, tubes for open filaments.

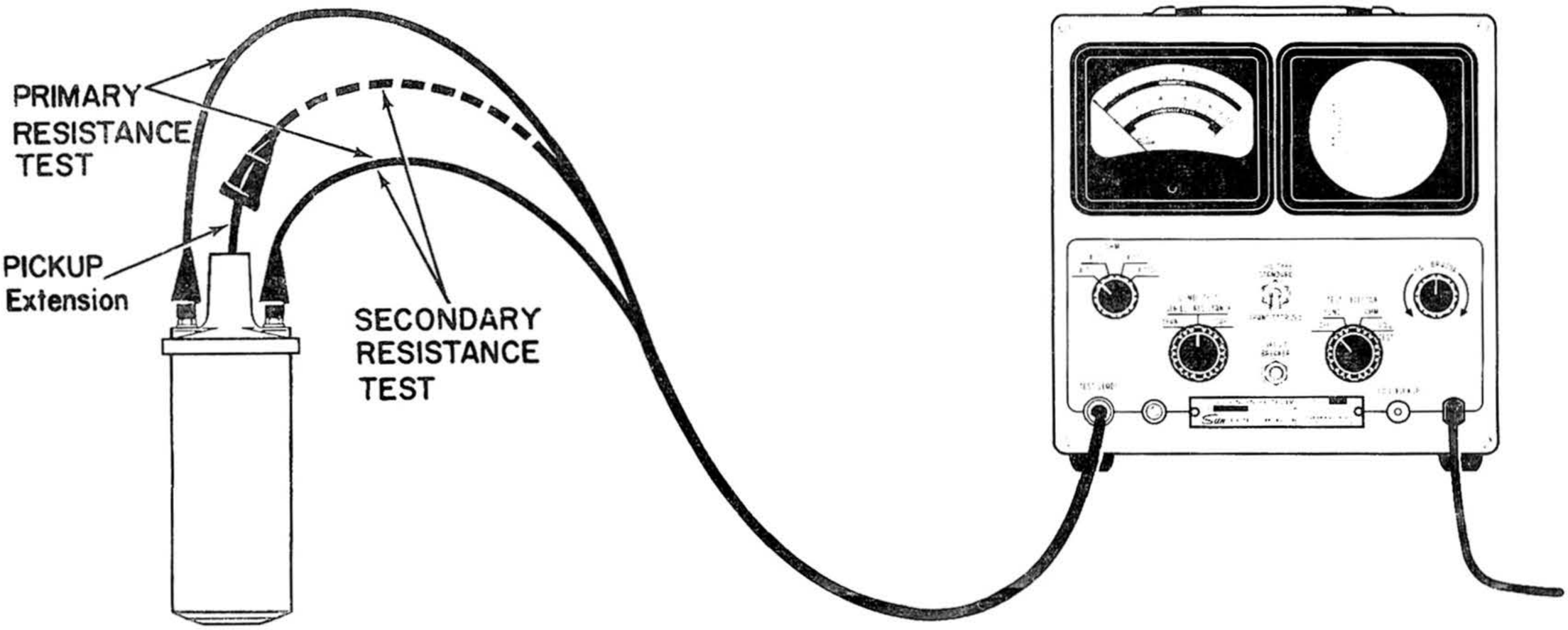
6. Ignition system suppressor resistors, distributor caps, rotors, spark plugs, or spark plug wires.

RESISTANCE TESTS OF IGNITION COIL WINDINGS

If resistance tests are to be made with the coil in the vehicle, the coil must be electrically isolated from the vehicle electrical system by disconnecting both primary leads from its terminals and removing the secondary lead from the coil tower.

PRIMARY RESISTANCE TEST

1. Turn TEST SELECTOR switch to OHM position.
2. With the OHMS switch set in the X1 position, clip TEST LEADS together and calibrate the meter.
3. Separate TEST LEADS and connect one to each coil primary terminal as shown.
4. Observe meter reading and compare with specifications.



SECONDARY RESISTANCE TEST

1. With the OHMS switch in the X1000 position, calibrate the OHMMETER.
2. Install pickup extension in coil secondary tower.
3. Connect TEST LEADS, one to either coil primary terminal, the other to the pickup extension as shown.
4. Observe meter reading and compare with specifications.

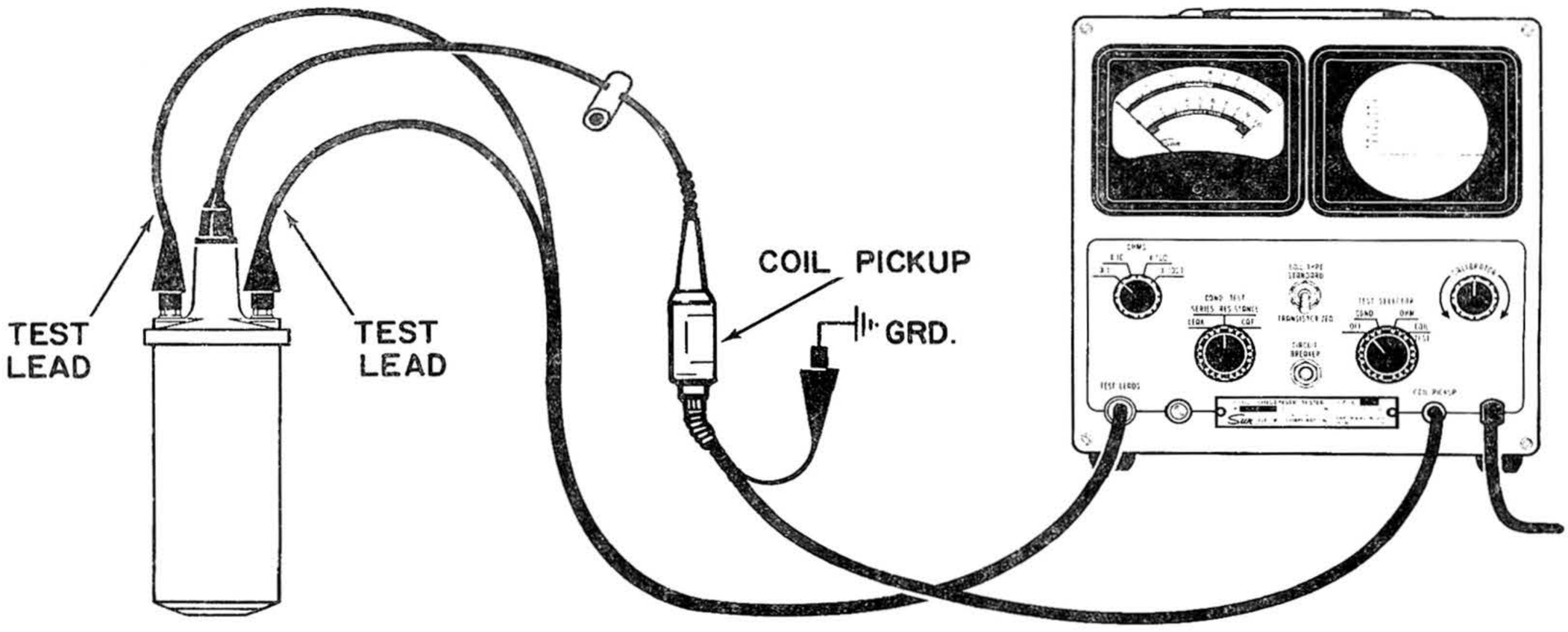
PRIMARY GROUND TEST

1. Connect TEST LEADS, one to either coil primary terminal and the other to the coil case.
2. Turn OHMS switch to X1000 position.
3. OHMMETER should show no meter movement. Any meter movement will indicate a grounded primary winding.
   NOTE: To completely test the coil, the Ignition Coil test must also be made.

IGNITION COIL TEST

The IGNITION COIL Test may be performed on or off the vehicle. For on-the-vehicle tests it will be necessary to electrically isolate the coil from the rest of the system by disconnecting both primary leads and removing the high tension lead from the coil tower.

1. Plug power cord into proper AC outlet.
2. Set TEST SELECTOR switch to OHM position.
3. Connect TEST LEADS, one to each coil primary terminal. Observe polarity, Red to +, Black to -.



4. Insert COIL PICKUP into coil secondary terminal and connect ground lead to good ground.

5. Set COIL TYPE switch to STANDARD for standard coil; to TRANSISTORIZED for coil of transistorized ignition.

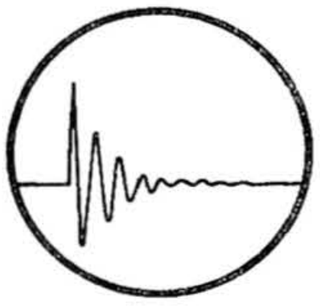
6. Rotate CALIBRATOR fully counterclockwise to provide low initial input to the coil being tested.

7. Turn TEST SELECTOR switch to the COIL TEST position and observe pattern on scope.

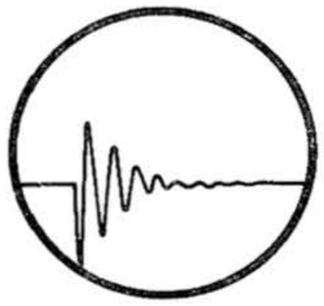
NOTE: While a coil is under test the input to the coil may be varied by adjusting the CALIBRATOR. In this manner the insulation of the coil may be stressed to the degree desired by the operator or specified by the manufacturer. The secondary output of the coil can be measured in Kilovolts (1000V) by noting the vertical height, on the 32 KV scale, of the pattern observed.

8. Rotate CALIBRATOR until highest portion of the waveform reaches 20 KV. Do not exceed 25 KV unless specified by manufacturer or coil may be damaged.

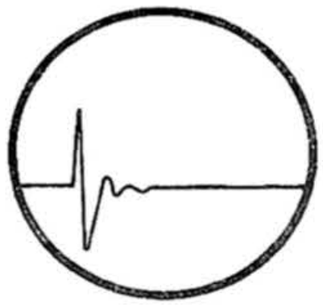
RESULT AND INDICATIONS



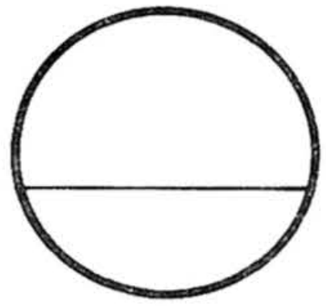
A. Normal - waveform height is 20 KV or more and oscillations resemble those in illustration.



B. Reversed polarity - first oscillation extending downward instead of up.



C. Shorted - waveform height is less than 20 KV and few oscillations are seen. Defective coil due to shorted windings or internal insulation breakdown.



D. Open - coil has open primary winding.

E. Waveform height is 20 KV or more but pattern is unstable or "jittery." Coil is defective due to internal insulation breakdown.

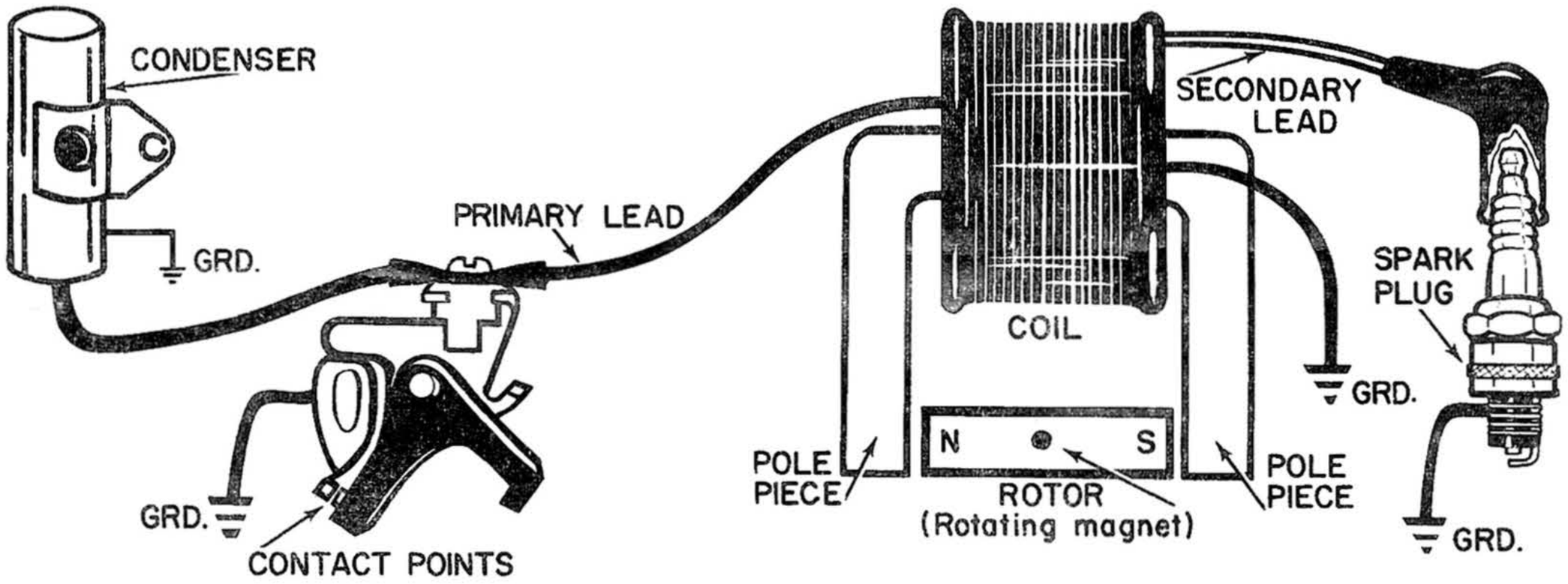
MAGNETO COIL TEST

Magneto type coils may be tested using the basic procedures outlined above. In most cases, however, the magneto must be partially disassembled to permit making the necessary test connections. Adapters are provided to assist in making these connections. The coil must be electrically isolated, or disconnected, from the rest of the system. The various types of coils found on marine and small engine applications will differ greatly in physical appearance, but the function in all cases is to provide voltage sufficient to cause an electrical spark at the spark plug gap. The test procedure and connections will be basically the same for all coils because their operating principles are alike.

Shown below is a pictorial diagram and brief description of the operation of a typical magneto ignition system.

Principles of Magneto Operation
(Refer to Diagram)

When the magneto shaft turns, a powerful magnet, with its associated magnetic field, is put in motion. With the contact points closed, the motion of this magnetic field induces a current flow in the primary winding of the magneto. An electromagnetic field is then built up around the primary winding. The contact points are timed to open when this magnetic field reaches its peak. The primary circuit is then broken and the magnetic field around the primary collapses. Induced voltage in the primary is absorbed by the condenser and current flow is brought to an abrupt halt. As the primary field collapses, the magnetic lines of force move across the secondary winding, inducing a high voltage in the secondary. This high voltage causes a spark to bridge the spark plug gap and the firing cycle is complete.



Test procedure is as follows:

1. Plug power cord into proper AC outlet.
2. Set TEST SELECTOR switch to OHM position.
3. Connect TEST LEADS, one to each end of coil primary circuit.
4. Connect COIL PICKUP to secondary lead of coil. Connect ground lead to good ground.
5. Rotate CALIBRATOR fully counterclockwise to provide low initial input to coil being tested.
6. Turn TEST SELECTOR switch to COIL TEST position and observe pattern on scope. If first oscillation is below zero (points downward), coil test polarity is incorrect. Reverse TEST LEADS for proper polarity.

NOTE: When coil is under test, the CALIBRATOR may be rotated to vary the stress to

the desired degree. It is important, however, that the manufacturer's recommendations as to upper limits of stress voltage be followed, or permanent damage may be done to the coil.

RESULT AND INDICATIONS

Due to the variations in coil design (different turns ratios, different intended usages, etc.) the patterns observed will differ. The pattern observed should be bell-shaped and steady but the number of oscillations and height of the pattern will vary with the type of coil being tested. When the correct pattern is not known, the following procedure is recommended:

1. Test three known good coils of the same type as the coil to be checked.

2. Record oscillation heights and numbers of oscillations at 20 KV stress.

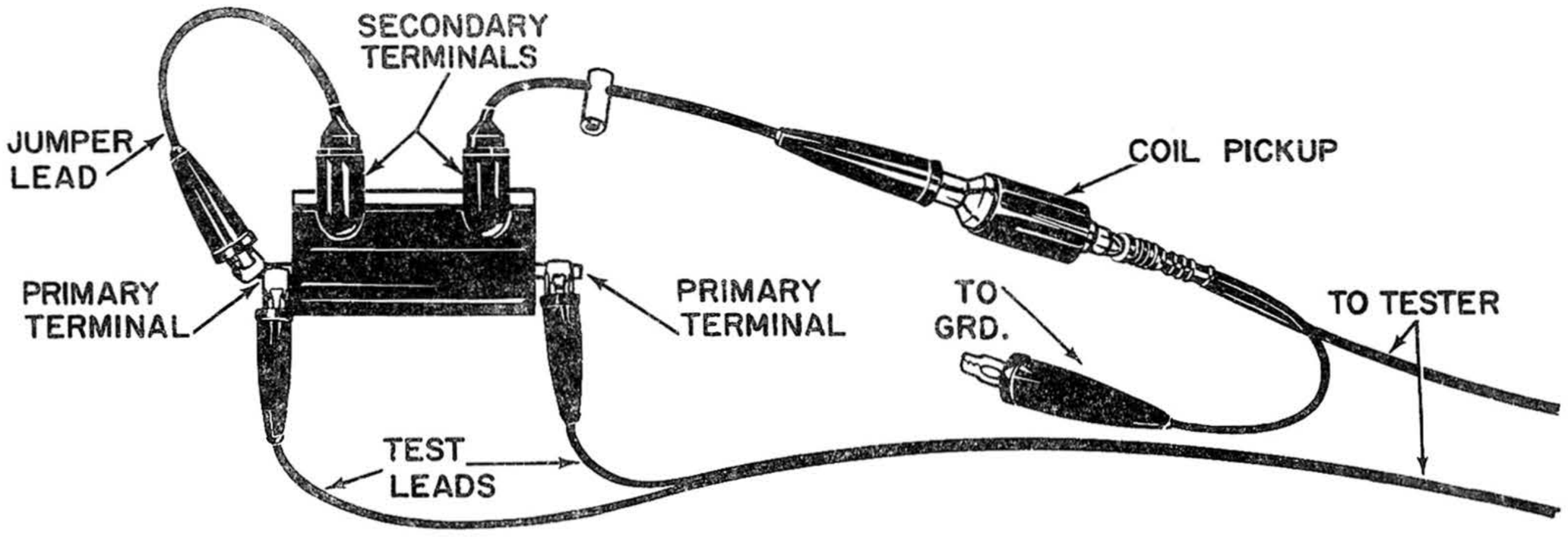
3. Test coil which is suspected of being defective.

4. Compare.

In this way the performance of a suspect coil may be compared to that of coils which are known to be good.

COIL WITH ISOLATED SECONDARY

On small engine coils with isolated secondary windings ie; Harley-Davidson, connect a jumper from one secondary terminal to either primary terminal. This connection provides a path for secondary current so that the secondary pattern can be viewed on the scope screen. Make all other test connections as outlined in preceeding instructions and observe pattern on scope screen. If pattern is inverted (first oscillation pointing downward) primary terminal connections are incorrect and should be reversed.



TESTING SECONDARY INSULATION

NOTE: In order to make these tests, the coil should test "good."

1. Make coil hookup as shown on following page.

   A. Connect TEST LEADS to coil primary terminals, observing polarity; Red to +, Black to -.

   B. Install COIL PICKUP in coil secondary terminal.

   C. If tests are to be made "on the vehicle," connect ground lead to good ground.

   D. Rotate CALIBRATOR fully counterclockwise for low initial input.

   E. Turn TEST SELECTOR switch to COIL TEST position and observe pattern on scope screen.

2. If the coil under test is indicated to be "good," it may be used as a test coil to perform the following insulation breakdown tests. While using the test coil as a high voltage source, the waveform on the coil scope will remain normal, if the secondary insulation under test is in good condition. If an insulation breakdown exists, the pattern size will diminish greatly and change in shape, as if the coil were shorted.

3. Attach high tension jumper lead with alligator clip in COIL PICKUP adapter.

4. With TEST SELECTOR switch in COIL TEST position, and pattern displayed on screen,

A. Remove distributor cap and touch jumper (from COIL PICKUP) to rotor blade. Observe scope pattern for test result.

B. Remove rotor and replace cap. Touch jumper to wire in center tower of cap. Observe scope pattern for test result.

C. Lift one spark plug wire off a spark plug and touch jumper to plug end of wire. Replace and repeat for all other plug wires. For each wire, observe scope pattern for test result.

5. The insulation may be "stressed" by rotating the CALIBRATOR to provide a higher KV output from the coil. In some cases, insulation may test "good" at low KV, but defective at higher KV.

6. If the units tested are "off the vehicle," the tests may be performed by grounding the units with the ground lead of the COIL PICKUP. The tests may then be completed as outlined above.